EUROPEAN PATENT OFFIC

Patent Abstracts of Japan

PUBLICATION NUMBER

2004317534

PUBLICATION DATE

11-11-04

APPLICATION DATE

11-04-03

APPLICATION NUMBER

2003107170

APPLICANT :

NIKON CORP:

INVENTOR :

OMURA YASUHIRO:

INT.CL.

G02B 17/08 G02B 13/14 G02B 13/18

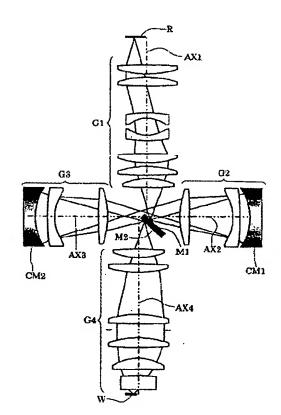
G03F 7/20 H01L 21/027

TITLE

CATADIOPTRIC IMAGE-FORMATION

OPTICAL SYSTEM, EXPOSURE

DEVICE, AND EXPOSURE METHOD



ABSTRACT :

PROBLEM TO BE SOLVED: To provide a catadioptric image-formation optical system which has a relatively large numerical aperture in a vacuum ultraviolet-ray wavelength band and is easily optically adjusted and mechanically designed and has various aberrations including chromatic aberration sufficiently compensated and has ≤0.1µm resolution.

SOLUTION: The catadioptric image-formation optical system forms an image of a first surface (R) on a second surface (W) and is provided with; a first imaging optical system (G1) of refraction type for forming a first intermediate image of the first surface; a second imaging optical system (G2) which includes a concave reflecting mirror (CM1) and forms a second intermediate image on the basis of a luminous flux from the first intermediate image; a third imaging optical system (G3) which includes a concave reflecting mirror (CM2) and forms a third intermediate image on the basis of a luminous flux from the second intermediate image; and a fourth imaging optical system (G4) of refraction type for forming the final image on the second surface on the basis of a luminous flux from the third intermediate image. The imaging optical system has an effective imaging area having a prescribed shape, which doesn't include an optical axis (AX4) of the fourth imaging optical system, on the second surface.

COPYRIGHT: (C)2005, JPO&NCIPI